

CLAIMS

1. Use for improving the hydro- and oil-repellence properties of substrata with a low surface energy having a critical wetting tension lower than 40 mN/meter, of (per)fluoro-polyether mono- and bifunctional derivatives having the following structures:

W-L-YFC-O-R_f-CFY-L-W (I)

R_f-CFY-L-W (II)

wherein:

L is a linking organic group -CO-NR'--(CH₂)_q-, with R'=H or C₁-C₄ alkyl; q is an integer comprised between 1 and 8, preferably 1-3;

Y=F, CF₃;

W is a -Si(R₁)_α(OR₂)_{3-α} group with α=0,1,2, R₁ and R₂ equal to or different from each other are C₁-C₆ alkyl groups, optionally containing one or more ether O, C₆-C₁₀ aryl groups, C₇-C₁₂ alkyl-aryls or aryl-alkyls;

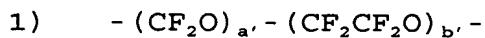
R_f has a number average molecular weight in the range 200-5,000, preferably 300-2,000 and it comprises repeating units having at least one of the following structures, statistically placed along the chain:

(CFXO), (CF₂CF₂O), (CF(CF₃)CF₂O), (CF₂CF(CF₃)O),

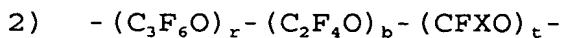
wherein X = F, CF₃.

2. Use according to claim 1, wherein R_f has one of the follo-

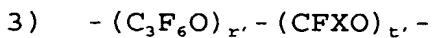
wing structures:



with a'/b' comprised between 0.5 and 2, extremes included, a' and b' being integers such to give the above mentioned molecular weight;



with $r/b = 0.5-2.0$; $(r+b)/t$ is in the range 10-30, b , r and t being integers such as to give the above mentioned molecular weight, x has the above indicated meaning;



t' can be 0;

when t' is different from 0 then $r'/t' = 10-30$, r' and t' being integers such to give the above mentioned molecular weight; x has the above indicated meaning;

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3. Use according to claims 1-2, wherein in structure (II) the other end group is of T-O- type, wherein T is a (per)fluoroalkyl group selected from: $-CF_3$, $-C_2F_5$, $-C_3F_7$, $-CF_2Cl$, $-C_2F_4Cl$, $-C_3F_6Cl$; optionally one or two F atoms, preferably one, can be replaced by H.

4. Use according to claims 1-3, wherein the compounds (I) and (II) are used in mixture.

5. Use according to claims 1-4, wherein the perfluoropolyether derivatives have formula (I) with R_f having structu-

re (3).

6. Use according to claims 1-5, wherein the substrata having a low surface energy are selected from the groups consisting of:

polytetrafluoroethylene, polyolefins, polyolefine elastomers, thermoplastic copolymers of tetrafluoroethylene, thermoplastic homopolymers and copolymers of vinylidene-fluoride or of chlorotrifluoroethylene.

7. Use according to claims 1-6, wherein the (per)fluoro-polyether derivatives are applied on the substrata by brushing, spraying, padding.

8. Use according to claims 1-7, wherein the (per)fluoropolyether derivatives are used in formulations comprising solvents or water/solvent mixtures.

9. Use according to claim 8, wherein the solvents are polar and are selected from the following classes:

aliphatic alcohols having from 1 to 6 carbon atoms; aliphatic glycols having from 2 to 8 carbon atoms, optionally having an esterified hydroxyl; ketones or esters having from 3 to 10 carbon atoms.

10. Use according to claims 8-9, wherein as water/solvent mixtures, ketone/water or alcohol/water mixtures in a ratio by volume between 10:90 and 90:10 are used.

11. Use according to claims 8-10, wherein in the formulations

the concentration of the (per)fluoropolyethers of formula (I) and (II) is generally in the range 0.1-30% by weight.

12. Use according to claims 1-11, wherein the amount of (per)-fluoropolyether compound applied on the substratum surface is in the range 0.1-20 g/m².
13. Use according to claims 1-12, wherein the polar solvent is combined with water, optionally in the presence of a silanization catalyst.
14. Use according to claims 1-12, wherein a thermal treatment cycle to favour the crosslinking is used.